

Claims

1. A water-dispersible and substantially non-combustible liquid vitamin composition comprising:

5 a) from 10% to 60% by weight of a vitamin component selected from the group consisting of:

10 (i) one or more precursors of Vitamin A;

(ii) one or more precursors of Vitamin E;

(iii) a mixture of one or more precursors of Vitamin A and one or more precursors of Vitamin E;

(iv) a mixture of one or more precursors of Vitamin A and Vitamin D3;

(v) a mixture of one or more precursors of Vitamin E and Vitamin D3; and

(vi) a mixture of one or more precursors of Vitamin A, one or more precursors of Vitamin E, and Vitamin D3;

15 b) from 2% to 15% by weight of a C4 to C6 alkyl lactate;

c) from 20% to 50% by weight of one or more veterinarily acceptable emulsifiers;

d) from 1% to 15% by weight of water; and

e) from 2% to 10% of an oil;

wherein the flashpoint of the composition is about 200°F or greater.

20 2. The composition of Claim 1, wherein said composition further comprises from 1% to 15% by weight of a veterinarily acceptable stabilizer.

3. The composition of Claim 2, wherein the stabilizer is propylene glycol.

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4. The composition of claim 1, wherein the amount of the alkyl lactate is from 4% to 7%.

5. The composition of claim 1, wherein the composition is substantially free of a flammable alcohol.

6. The composition of Claim 1, wherein the ratio of b) to d) is from 1:5 to 10:1.

7. The composition of claim 1, wherein the emulsifier is a non-ionic surfactant.

8. The composition of claim 1, further comprising from 0.5% to 6% by weight of an antioxidant.

9. The composition of claim 8, wherein the antioxidant is ethoxyquin, BHT or BHA.

10. The composition of claim 9, wherein the antioxidant is ethoxyquin.

11. The composition of claim 1, wherein the viscosity of the composition is from 1000 cP to 10000 cP at 0°C.

12. The composition of claim 1, wherein the viscosity of the composition is from 100 cP to 2000 cP at 15°C.

13. The composition of claim 1, wherein said composition adequately disperses into water within 2 minutes when added at a ratio of composition to water of from 1 g/kg to 50 g/kg.

14. The composition of claim 1, wherein the amount of water is from 1% to 5% by weight.

15. The composition of claim 1, wherein component a) is one or more precursors of Vitamin A.

16. The composition of claim 1, wherein component a) is one or more precursors of Vitamin E

5 17. The composition of claim 1, wherein component a) comprises a precursor of Vitamin A and Vitamin D3 and the weight/weight ratio of the precursor of Vitamin A to Vitamin D3 is from 100:1 to 40:1.

18. The composition of claim 15, wherein the total amount of the one or more precursors of Vitamin A in the composition is from 15 to 50% by weight.

10 19. The composition of claim 16, wherein the total amount of the one or more precursors of Vitamin E in the composition is from 10 to 60% by weight.

20. A water-dispersible and substantially non-combustible liquid vitamin composition comprising:

15 a) from 10% to 60% by weight of a vitamin component selected from the group

consisting of:

(i) one or more precursors of Vitamin A;

(ii) one or more precursors of Vitamin E;

(iii) a mixture of one or more precursors of Vitamin A and one or more

20 precursors of Vitamin E;

(iv) a mixture of one or more precursors of Vitamin A and Vitamin D3;

(v) a mixture of one or more precursors of Vitamin E and Vitamin D3; and

(vi) a mixture of one or more precursors of Vitamin A, one or more

precursors of Vitamin E, and Vitamin D3;

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b) from 3% to 15% by weight of a C1 to C3 alkyl lactate;

c) from 20% to 50% by weight of one or more veterinarily acceptable emulsifiers;

d) from 3% to 15% by weight of water; and

e) from 2% to 10% of an oil;

5 wherein the flashpoint of the composition is about 200°F or greater.

21. The composition of claim 20, wherein said composition further comprises from 1% to 15% by weight of a veterinarily acceptable stabilizer.

22. The composition of claim 21, wherein the stabilizer is propylene glycol.

23. The composition of claim 24, wherein the amount of the C1-C3 alkyl lactate is from 3% to 12%.

24. The composition of claim 20, wherein the composition is substantially free of a mono-hydroxy alcohol.

25. The composition of Claim 20, wherein the ratio of b) to d) is from 1:5 to 4:1.

15 26. The composition of claim 20, wherein the emulsifier is a non-ionic surfactant.

27. The composition of claim 20, further comprising from 0.5% to 6% by weight of an antioxidant.

29. The composition of claim 27, wherein the antioxidant is ethoxyquin, BHT or BHA.

30. The composition of claim 29, wherein the antioxidant is ethoxyquin.

Sub 31. The composition of claim 22, wherein the viscosity of the composition is from 1000 cP to 10000 cP at 0°C.

32. The composition of claim 20, wherein the viscosity of the composition is from 100 cP to 2000 cP at 15°C.

*Sub A* 33. The composition of claim 20, wherein said composition adequately disperses into water within 2 minutes when added at a ratio of composition to water of from 1 g/kg to 50 g/kg.

34. The composition of claim 20, wherein the amount of water is from 3% to 6% by weight.

10 35. The composition of claim 20, wherein component a) is one or more precursors of Vitamin A.

36. The composition of claim 20, wherein component a) is one or more precursors of Vitamin E.

15 37. The composition of claim 20, wherein component a) comprises a precursor of Vitamin A and Vitamin D3 and the weight/weight ratio of the precursor of Vitamin A to Vitamin D3 is from 100:1 to 40:1.

38. The composition of claim 35, wherein the total amount of the one or more precursors of Vitamin A in the composition is from 15 to 50% by weight.

39. The composition of claim 36, wherein the total amount of the one or more precursors of Vitamin E in the composition is from 10% to 30% by weight.

20 40. The composition of claim 1, further comprising a fungicide.

41. The composition of claim 20, further comprising a fungicide.

*Sub A* 42. A water-dispersible and substantially non-combustible liquid vitamin composition comprising:

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- a) from 1% to 6% by weight of Vitamin D3;
- b) from 2% to 15% by weight of a C4 to C6 alkyl lactate;
- c) from 20% to 50% by weight of one or more veterinarily acceptable emulsifiers;
- d) from 1% to 15% by weight of water; and
- e) from 5% to 30% by weight of an oil;

wherein the flashpoint of the composition is about 200°F or greater.

10 43. A water-dispersible and substantially non-combustible liquid vitamin

composition comprising:

- a) from 1% to 6% by weight of Vitamin D3;
- b) from 3% to 15% by weight of a C1 to C3 alkyl lactate;
- c) from 20% to 50% by weight of one or more veterinarily acceptable emulsifiers;
- d) from 1% to 15% by weight of water; and
- e) from 5% to 30% by weight of an oil;

15 wherein the flashpoint of the composition is about 200°F or greater.

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